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Data Sheet

ETX-2

Carrier Ethernet Demarcation

- Feature-rich demarcation and aggregation suite, offering a complete Service Assured Access (SAA) solution
- Ideal for service providers, wholesalers and mobile operators, seeking to deliver and monitor SLA-based MEF-certified Carrier Ethernet 2.0, Layer-3 VPN, and TDM-over-packet services
- Versatile offering of multi-rate Ethernet over fiber, SHDSL, PDH, and TDM, assuring unified service delivery over any access technology
- TWAMP and layer-2 OAM, as well as diagnostics for scalable and accurate traffic monitoring, quick fault detection, and troubleshooting of layer-2 and layer-3 networks
- Distributed network functions virtualization (D-NFV) for rapid rollout of new services and network capabilities

SyncToP

The ETX-2 Carrier Ethernet demarcation device, together with the ETX-5 Carrier Ethernet aggregation platform, are the main components of RAD's Service Assured Access solution, providing:

- Ethernet service uniformity over multiple access technologies including GbE and 10GbE, SHDSL, PDH, and SDH
- Operation in diverse topologies including ring, daisy chain, and hub and spoke
- PW functionality for mobile backhauling and business services
- Synchronization for mobile 2G, 3G, LTE, and LTE-A backhauling networks.

ETX-2 is offered in a variety of product options (ETX-203AM, ETX-203AX, ETX-205A, ETX-220A, ETX-2i). The new ETX-2i member is a next-generation hybrid L2 and L3 demarcation device. *Table 1* provides further information on the capabilities offered by each device.

MARKET SEGMENTS AND APPLICATIONS

ETX-2 is ideal for carriers, service providers, wholesale providers, and mobile operators seeking to offer unified SLA-based Ethernet business services, such as E-Line, E-LAN, E-Tree, and E-Access services, as well as L3 VPNs and value-added services using virtualization at the customer edge.

NETWORK TOPOLOGIES AND INTEROPERABILITY

ETX-2 supports several network topologies such as linear, daisy chain, and self-healing rings (G.8032v2), working with ETX-5 or third-party Ethernet devices.

D-NFV

The D-NFV option allows for seamless insertion of a standard Intel x86 core as an optional module. The D-NFV module hosts virtual machines providing virtual network functions (VFs) or value-added service capabilities. This enables service providers to quickly and easily provide new services and implement new network capabilities, with the benefit of function localization at the customer premises.

CARRIER ETHERNET 2.0

ETX-2 incorporates a complete set of CE 2.0-certified Ethernet service tools that allow the service provider to distinguish between high- and low-priority traffic, and to optimize TCP sessions.

ETX-2 provides MEF 10.3 rank policers, delivering high-scale multi-CoS services with hierarchical Quality of Service (HQoS). Additionally, it supports advanced scheduling, WRED per CoS, shaping per EVC and per port, and flexible classification rules with flexible access lists.

Services

ETX-2 delivers E-Line (EVL, EVPL), E-LAN (EPLAN, EVPLAN), E-Tree (EP-TREE, EVP-TREE), and E-Access services.

Layer-2 Control Processing

ETX-2 can be configured to forward Layer-2 control frames (including other vendors' L2CP frames), with optional MAC change, across the network or to peer supported protocols (IEEE 802.3-2005 and LACP), or to discard the L2CP frames.

ROUTING

ETX-2 offers an optional embedded router with Virtual Routing and Forwarding (VRF) instances, allowing service providers to deploy L2 and L3 VPNs. The forwarding engine capability ranges from 1 to 8 Gbps, allowing for Carrier Ethernet and IP services to be offered in a single device providing high-capacity performance monitoring, network function virtualization (NFV), and more.

RAD

Your Network's Edge

ETX-2

Carrier Ethernet Demarcation

ETHERNET OVER PDH

ETX-2 transports Ethernet over PDH infrastructure via the following NG-PDH technologies:

- Generic Framing Procedure (GFP G.7041)
- GFP o PDH (G.8040)
- PDH Virtual Concatenation (VCAT G.7043)
- Link Capacity Adjustment Scheme (VCAT G.7042).

NG-PDH solutions improve overall network availability by reducing latency and optimizing line utilization and throughput.

Integrated management of MiRICi and MiTOP smart SFPs provides TDM (E1/T1/E3/T3/ OC-3/STM-1) connectivity over PDH or SDH legacy networks.

TDM PSEUDOWIRE

ETX-2 provides pseudowire (PW) services via 4 or 8 integrated E1/T1interfaces, as well as via a smart SFP (MiTOP).
The PWs can be encapsulated using CESoPSN per IETF RFC 5086 or SAToP per IETF RFC 4553. The PWs are transmitted over IP networks or L2 networks with UDP/IP or MEF-8 encapsulation.

RESILIENCY

ETX-2 offers fast protection for virtually any kind of failure and in any linear, ring, or dual-homed topology. The device employs IEEE 802.3ad link aggregation (1:1 LAG), ITU-T G.8032v2 Ethernet ring protection, and ITU-T G.8031 Ethernet linear protection to ensure continuous availability and sub-50ms restoration in the event of network outages.

TIMING AND SYNCHRONIZATION

ETX-2 incorporates RAD's advanced SyncTop synchronization and timing over packet feature set to support mobile heterogeneous network (HetNet) topology.

The device combines Synchronous Ethernet (SyncE) with IEEE 1588v2 Precision Time Protocol per ITU-T G.8265.1 and G.8275.1 Telecom profiles for cost-effective synchronization of frequency and phase.

With an integrated GNSS receiver and 1588v2 Grandmaster support, ETX-2 offers a Distributed GM™ solution, allowing mobile operators and service providers to cost-effectively provide reliable frequency and phase accuracy for LTE-A. The device also supports 1588v2 slave clock, boundary clock (BC), and transparent clock (TC), as well as a dual master operating simultaneously in G.8265.1 and G.8275.1 mode.

MANAGEMENT AND SECURITY

The device can be managed via RADview, RAD's carrier-class NMS, or any SNMP-based management system. ETX-2 supports a variety of access protocols, including CLI over Telnet, SNMPv3, and TFTP.

Security features include SNMPv3, RADIUS (client authentication), TACACS+ (client authentication, authorization, and accounting), SSH, and SFTP.

Access Control Lists (ACL) can also be used to flexibly filter and mark management traffic, enabling service providers to maintain network security by dropping unwanted packets.

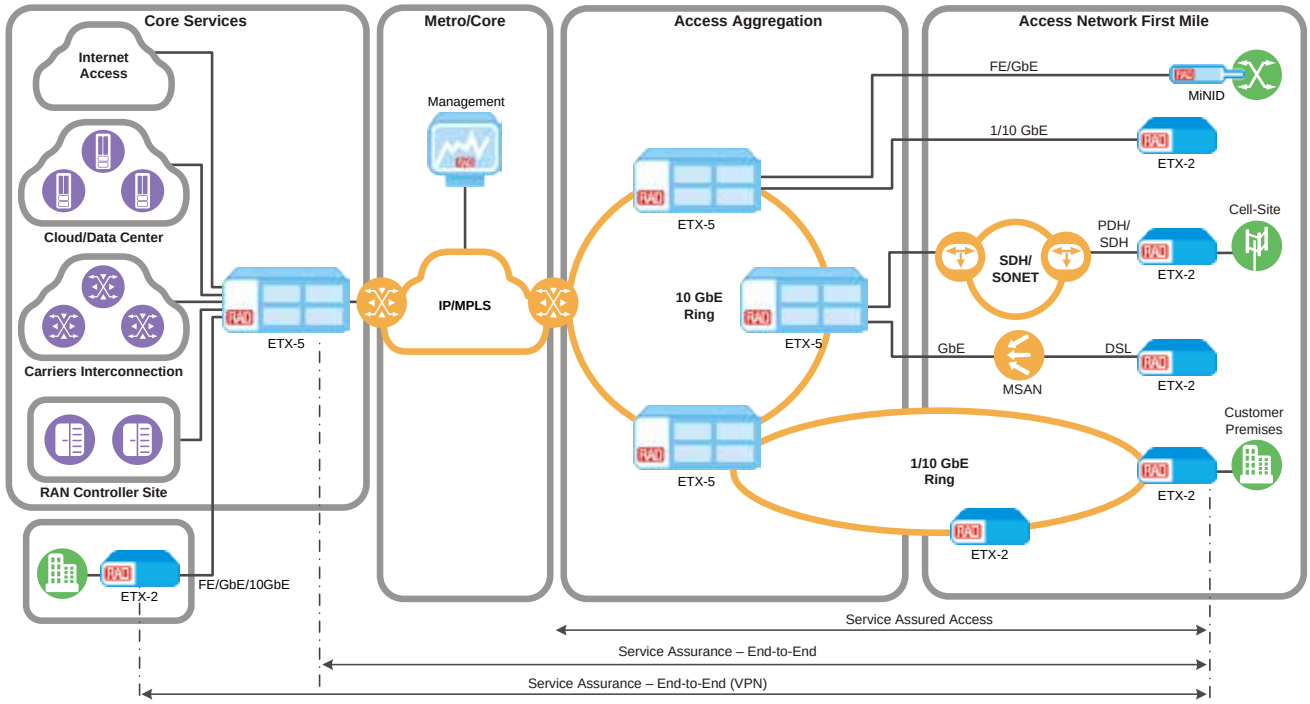

Figure 1. Access Aggregation with SLA-Based Services

Table 1. Feature Comparison

	Service Assured Access Capabilities	ETX-203AX	ETX-203AM	ETX-205A	ETX-220A	ETX-2i		
						Fixed Ports	Modular Uplink	D-NFV
Interfaces	10GbE XFP interfaces				ü			
	FE/GbE SFP interfaces	ü	ü	ü	ü	ü	ü	ü
	10/100/1000 electrical interfaces	ü	ü	ü	ü	ü	ü	ü
	GbE combo interfaces		2 (modular)	ü		ü	ü	ü
	Extension slot for network interface module		ü				ü	ü
	Extension slot for D-NFV module			Integrated				ü
	PDH network interfaces (GFP mapping)		4/8 E1/T1, 1/2 T3				4/8 E1/T1, 1/2 T3	4/8 E1/T1, 1/2 T3
	SHDSL network interfaces		ü				ü	ü
	E1/T1 user interfaces (SAToP, CESoPSN, CAS)			ü				
	E1/T1/T3/STM-1/OC3 network interfaces via integrated smart SFP (MiRIC)	ü	ü	ü	ü	ü	ü	ü
	E1/T1/T3 PWE services via integrated smart SFP (MiTOP)	ü	ü	ü	ü	ü	ü	ü
	Optional timing interfaces (2 MHz, 2 Mbps, 1PPS, ToD)			ü	ü	ü	ü	ü
Networking Capabilities	Ethernet E-Line, E-LAN, E-Tree services	ü	ü	ü	ü	ü	ü	ü
	Ethernet E-Access services					ü	ü	ü
	Wire-speed Layer-2 forwarding	ü	ü	ü	ü	ü	ü	ü
	Wire-speed router supporting VRFs, static routing, BGPv4, OSPFv2, BFD, and VRRP		ü (1G)	ü (1G)		ü (8G)	ü (8G)	ü (8G)
	Flexible classification rules	ü	ü	ü	ü	ü	ü	ü
	Available bandwidth measurements for Layer-2 services	ü	ü	ü	ü	ü	ü	ü
	2-rate/3-color policing per EVC.CoS	ü	ü	ü	ü	ü	ü	ü
	Shaping per EVC and EVC.CoS	ü	ü	ü	ü	ü	ü	ü
	MultiCoS EVCs per MEF 10.3 policing				ü	ü	ü	ü
	Strict priority and weighted fair queuing (WFQ) scheduling	ü	ü	ü	ü	ü	ü	ü
	G.8031 linear protection	ü	ü	ü	ü	ü	ü	ü
	G.8032v2 ring protection	ü	ü	ü	ü	ü	ü	ü
	1:1 link protection with 1:1 LAG/LACP	ü	ü	ü	ü	ü	ü	ü
	1:1 link protection with dual homing	ü	ü	ü	ü	ü	ü	ü
	LAG with load balancing				ü	ü	ü	ü
	Jumbo frame support	ü	ü	ü	ü	ü	ü	ü
	Synchronous Ethernet (SyncE) on all interfaces			ü	ü	ü	ü	ü
	IEEE-1588v2 precision time protocol (PTP) per G.8265.1 and G.8275.1 Telecom profiles	TC	TC	Slave, TC, BC, GM with integrated GPS	Slave, TC, BC	Slave, TC, BC	Slave, TC, BC	Slave, TC, BC
	D-NFV option with x.86 processor			ü (integrated)				ü (modular)

Table 1. Feature Comparison (Continued)

	Specifications	ETX-203AX	ETX-203AM	ETX-205A	ETX-220A	ETX-2i		
						Fixed Ports	Modular Uplink	D-NFV
OAM and Diagnostics	Built-in RFC-2544 service activation testers	ü	ü	ü	ü	ü	ü	ü
	Built-in Y.1564 service activation testers	ü	ü	ü	ü (up to 10G services)	ü	ü	ü
	Continuity fault management (CFM) per IEEE 802.3ag	ü	ü	ü	ü	ü	ü	ü
	Service utilization and performance monitoring per ITU-T Y.1731.2012, including synthetic loss measurement	ü	ü	ü	ü	ü	ü	ü
	Delay and loss measurements per MEF 36	ü	ü	ü	ü	ü	ü	ü
	TWAMP light generator and responder (SW license)	ü	ü	ü	ü	ü	ü	ü
	High-scale PM controller with TWAMP light generators (with D-NFV option)			ü				ü
	Accurate one-way KPI measurements			ü	ü	ü	ü	ü
	LLDP discovery per IEEE 802.1AB	ü	ü	ü	ü	ü	ü	ü
	Link-level OAM per IEEE 802.3-2005	ü	ü	ü	ü	ü	ü	ü
	RMON2 port-level counters	ü	ü	ü	ü	ü	ü	ü
	On-demand Layer-2 and 3 loopbacks	ü	ü	ü	ü	ü	ü	ü
General and Management	Automatic flow and profile name completion in CLI	ü	ü	ü	ü	ü	ü	ü
	TWAMP license	ü	ü	ü	ü	ü	ü	ü
	Zero-touch provisioning (DHCP, PPPoE)	ü	ü	ü	ü	ü	ü	ü
	SNMPv1/v2/v3	ü	ü	ü	ü	ü	ü	ü
	RADIUS and TACACS+ AAA	ü	ü	ü	ü	ü	ü	ü
	Network time protocol (NTP)	ü	ü	ü	ü	ü	ü	ü
	Power supply redundancy			ü*	ü	ü	ü	ü
	NEBS option	ü	ü	ü*	ü	ü	ü	ü
	Temperature-hardened option	ü	ü	ü*	ü	ü	ü	
	MEF CE2.0	Certified	Certified	Certified	Certified	Compliant	Compliant	Compliant

* Not applicable with D-NFV option

MONITORING AND DIAGNOSTICS

Featuring multi-layer OAM and PM tools, ETX-2 performs hardware-based monitoring and diagnostics at high scale and precision. End-to-end connectivity OAM (IEEE 802.1ag) as well as single-segment OAM (IEEE 802.3-2005) ensure flow-level fault management and performance monitoring over Layer-2 networks and also quickly detect connectivity failures for robust protection. Layer-2 and 3 wire-speed loopbacks offer flexible diagnostic tools.

RFC-5357 TWAMP light delivers the same functionality over Layer-3 networks, as well as one-way TWAMP with counters for loss, delay, fragmented packets, reorders and duplication, in addition to configurable test packet size. A high-scale PM controller option based on ETX-205A with a dedicated enclosure provides high-scale TWAMP.

The Performance Management Portal is an SLA assurance system that is part of the RADview management system, enabling real-time monitoring of Ethernet service performance by collecting KPI data from RAD devices.

Service Activation Tests

The ETX-2 family offers service activation tools with multiple RFC-2544, Y.1564, and L3 SAT testers.

Digital Diagnostics Monitoring

ETX-2 supports digital diagnostics monitoring (DDM) SFP functions according to SFF-8472, excluding external DDM calibration.

Specifications

CAPACITY

Max. Frame Size
12,288 bytes with Ethernet uplinks

2,048 bytes with SHDSL uplink module

10,240 bytes with E1/T1/T3 EoPDH uplink module

BRIDGE

Compliance
802.1D, 802.1Q, 802.1ad

Mode
VLAN-aware, VLAN-unaware

ROUTER

(ETX-203AM, ETX-205A, ETX-2i

Router (if ordered) providing:

- Up to 1 Gbps in ETX-203AM and ETX-205A
- Up to 8 Gbps in ETX-2i
- Layer-3 IPv4 and IPv6 forwarding with performance of over 2 MPPS
- Bidirectional forwarding detection (IP-BFD single hop) for fast forwarding path failure detection
- Inbound ACLs
- Static routing, or dynamic routing with OSPFv2, BGPv4VRRPv2 and VRRPv3.

VLAN Editing
Inner/outer VLAN editing per VLAN and p-bit values

HIERARCHICAL QUALITY OF SERVICE (HQOS)

Policing
Dual token bucket with user-configurable CIR + CBS and EIR + EBS

ETX-220A, ETX-2i: Bandwidth policing per MEF 10.3

Scheduling
8 × CoS per EVC scheduling elements
Strict Priority (SP) and Weighted Fair Queue (WFQ)

Shaping
Per port (ETX-220A, ETX-2i)

Per EVC

Per EVC.CoS

FLOWS

Classification
Per port, outer VLAN or outer + inner VLAN, PCP, TOS/DSCP, Ethertype, IP/MAC source/destination address, or 5-tuple ACL

Max. Number of Concurrent Flows
ETX-203AM, ETX-203AX, ETX-205A: 270
ETX-220A: 2000
ETX-2i: 1000

RESILIENCY

Dual Homing
Dual homed link redundancy

Link Aggregation
IEEE 802.1ax (802.3ad) 1:1 LAG with LACP for pairs of network or user Ethernet ports

Ethernet Ring
G.8032v2 rings with sub 50 ms protection for Ethernet traffic

Ethernet Path Protection
G.8031, for linear 1:1 protection

DIAGNOSTICS

Loopback Tests
Nondisruptive loopback per flow, with MAC/ IP address swap

Loopbacks at Ethernet port level

Service Activation Tests
RFC-2544: 8 built-in wire-speed testers
ITU-T Y.1564: 8 built-in wire-speed testers

Alarm Relay
(optional)

Type: Dry relay contact with three inputs and one relay
Connector: Terminal block, 9-pin

Table 2. Ethernet Interfaces

	Specifications	ETX-203AX	ETX-203AM	ETX-205A	ETX-220A	ETX-2i		
						Fixed Ports	Modular Uplink	D-NFV
10GbE	Number of Ports				Network: 1 or 2 User: 1 or 2			
	Type				XFP			
	Fiber Optic (XFP-based)				10GBaseSR, 10GBaseER, 10GBaseLR, 10GBaseZR			
	Connector				XFP slot			
	XFP Transceivers				See *Note*			
GbE	Number of Ports	Network: 2 User: 4	Network: 2 (with GbE module) User: 4	Network: 2 User: 4 with regular router, or 2 with wire-speed router or D-NFV option	Network: up to 2 User: up to 10 or 20	8	4 (2 additional optional ports with GbE module)	4 (2 additional optional ports with GbE module)
	Type	SFP or copper port	Network: SFP/copper combo port User: SFP or copper port	SFP/copper combo port	SFP or copper port	SFP/copper (RJ-45) combo ports	SFP/copper (RJ-45) combo ports	SFP/copper (RJ-45) combo ports
	Fiber Optic (SFP-based)	Fast Ethernet: 100BaseFx, 100BaseLX10, 100BaseBx10 Gigabit Ethernet: 1000BaseSx, 1000BaseLX10, 1000BaseBx10				100BaseFx, 1000BaseLx/Sx		
	Copper	10/100BaseT or 10/100/1000BaseT				10/100/1000BaseT		
	Connector	Port 1: SFP slot All other ports: SFP slot or RJ-45	Replaceable module with SFP slot and RJ-45	SFP slot or RJ-45	SFP slot or RJ-45	SFP slot or RJ-45	SFP slot or RJ-45	SFP slot or RJ-45
	SFP Transceivers	See *Note*	See *Note*	See *Note*	See *Note*	See *Note*	See *Note*	See *Note*

***Note**: It is strongly recommended to order this device with **original** RAD SFPs/XFPs. RAD cannot guarantee full compliance to product specifications for units using non-RAD SF at www.rad.com. For the list of SFP/XFP transceivers supported by ETX-220A, see the SFP/XFP Compatibility document.*

SHDSL INTERFACES

(Provided with SHDSL network module for ETX-203AM modular ordering option and ETX-2i modular and D-NFV ordering options)

Type
SHDSL.bis

Number of Ports
2 or 4

Number of Wires
4 or 8

Connectors
Replaceable network module, with one RJ-45 for 4-wire ordering option or two RJ-45s for 8-wire ordering option

Line Coding
16 or 32 TC-PAM

Line Rate
192–5696 kbps (see *Table 3*)

Impedance
135W

Compliance
ITU-T G.991.2, ETSI TS 101524

Bonding
According to IEEE 802.3ah, ITU-T G.998.2

E1/T1 INTERFACES

(ETX-203AM: EoPDH E1/T1 network module)

Number of Ports
4 or 8

Compliance
G.703, G.823

Data Rate
E1: 2.048 Mbps
T1: 1.544 Mbps

Line Coding
E1: HDB3
T1: B8ZS

Framing
E1: Framed (G732N with CRC)
T1: Framed (ESF)

Impedance
E1: 120W, balanced
75W, unbalanced (via adapter cable)
T1: 100W, balanced

Connectors
Replaceable module, with four RJ-45 connectors:
Four E1/T1 ports:
One E1/T1 interface per RJ-45
Eight E1/T1 ports:
Two E1/T1 interfaces per RJ-45, with adapter cable

T3 INTERFACES

(ETX-203AM: EoPDH T3 network module)

Number of Ports
1 or 2

Compliance
G.703, G.823

Data Rate
44.736 Mbps

Line Coding
B3ZS

Framing
C-bit parity

Impedance
75W, unbalanced

Connectors
Replaceable network module, with one or two pairs of BNC connectors:
One T3 port – One pair
Two T3 ports – Two pairs

E1/T1 INTERFACES

(ETX-205A: Built-in TDM PW E1/T1 ports)

Number of Ports
4 or 8

Compliance
E1: G.703, G.732N, G.732S
T1: ANSI T1.101, ANSI T1.403

Data Rate
E1:2.048 Mbps
T1: 1.544 Mbps

Line Coding
E1:HDB3
T1: B8ZS

Framing
E1: Framed (G.732N with or without CRC)
Framed with CAS (G.732S with or without CRC)
Unframed
T1: Unframed or ESF

Impedance
E1: 120W, balanced
75W, unbalanced (via adapter cable)
T1: 100W, balanced

Connectors
Electrical, RJ-45

Table 3. SHDSL Typical Ranges (26 AWG)

Data Rate	4-wire		8-wire	
[kbps]	[km]	[mi]	[km]	[mi]
192	8	4.9	8	4.9
512	6.7	4.1	6.7	4.1
1536	6	3.7	6.5	4
2048	5.7	3.5	6.4	3.9
4096	5.1	3.1	5.7	3.5
4608	5	3	5.5	3.4
5696	4.6	2.8	5.1	3.1
11392	2.9	1.8	4.6	2.8
17088	–	–	3.5	2.1
22784	–	–	2.9	1.8

ETX-2

Carrier Ethernet Demarcation

PSEUDOWIRE (ETX-205A)

Payload Encapsulation
CESoPSN, SAToP

Network Encapsulation
MEF 8, UDP/IP

TIMING

Synchronous Ethernet
ITU-T G.8261-G.8264

1558v2
Slave clock (ETX-205A, ETX-220A, ETX-2i)

Boundary clock (ETX-205A, ETX-220A, ETX-2i)

Master clock with GPS (ETX-205A, ETX-2i)

Dual master operating simultaneously in G.8265.1 and G.8275.1 mode (ETX-205A, ETX-220A, ETX-2i)

Transparent clock (TC)

Phase and frequency synchronization

Station Clock

(ETX-205A, ETX-220A, ETX-2i)
Type: Balanced E1, unbalanced E1 (via adapter cable)
Connector: RJ-45

PTP Ports

(ETX-205A, ETX-220A)
TOD/1PPS (RJ-45)
External clock (BNC)
1PPS (BNC)

(ETX-2i)
TOD/1PPS (RJ-45)
External clock (SMA)
1PPS (SMA)

MANAGEMENT

Ethernet Management Port
Type: 10/100/1000BaseT
Connector: RJ-45

Control Port

(ETX-203AM, ETX-203AX, ETX-205A, ETX-220A)
Interface: V.24/RS-232 DCE
Connector: RJ-45
Format: Asynchronous
Data rate: 9.6, 19.2, or 115.2 kbps

(ETX-2i)
Interface: RS-232 DCE
Connector: Mini USB
Format: Asynchronous
Data rate: 9.6, 19.2, or 115.2 kbps

Management Options
Password-protected access, authorization levels

Secure CLI via SSH

Telnet, SNMPv3, SFTP

RADIUS or TACACS+ authentication

Plug and play zero touch provisioning

Routing for Management
IP forwarding, dual-stack IPv4 and IPv6 routing, static routing

GENERAL

Compliance
CE 2.0, MEF 6 (E-Line – EPL and EVPL, E-LAN – EPLAN and EVPLAN), MEF 10, MEF 9, MEF 14, MEF 20, MEF 36, IEEE 802.3, 802.3u, 802.1q, 802.1p, 802.3ad, 802.3-2005, 802.1ax, 802.1ag, ITU-T Y.1731, G.8031, G.8032v2, G.8262, G.8265, RFC-2544, ITU-T Y.1564

Table 4. Power, Physical, and Environmental Specifications

	Specifications	ETX-203AX	ETX-203AM	ETX-205A	ETX-220A	ETX-2i		
						Fixed Ports	Modular Uplink	D-NFV
Power	Power (19" enclosure)	-	-	AC: 100 to 240 VAC, 50/60 Hz DC: 24/48 VDC nominal (20 to 72 VDC)	AC: 100 to 240 VAC, 50/60 Hz DC: -48 VDC nominal (-40 to 72 VDC)	AC: 100 to 240 VAC, 50/60 Hz DC: 24/38 to 72 VDC	AC: 100 to 240 VAC, 50/60 Hz DC: 24/38 to 72 VDC	AC: 100 to 240 VAC, 50/60 Hz DC: 24/38 to 72 VDC
	Power (8.5" enclosure)	Wide-range AC/DC with auto detection AC: 85 to 264 VAC, 47/63 Hz DC: 48 VDC (40 to 370 VDC)	AC: 100 to 230 VAC (±10%), 47–63 Hz DC: -48 VDC (36 to 72 VDC)	AC: 100 to 240 VAC, 50/60 Hz DC: 48 VDC (48 to 60 VDC)	-	AC: 100 to 240 VAC 50/60 Hz DC: Dual DC feed of 24/38 to 72 VDC	AC: 100 to 240 VAC 50/60 Hz DC: Dual DC feed of 24/38 to 72 VDC	-
Physical	Size (19" enclosure):							
	Height	-	-	43.7 mm (1.7 in)	43.7 mm (1.7 in)	43.7 mm (1.7 in)	43.7 mm (1.7 in)	43.7 mm (1.7 in)
	Width	-	-	440 mm (17.4 in)	440 mm (17.4 in)	440 mm (17.4 in)	440 mm (17.4 in)	440 mm (17.4 in)
	Depth	-	-	240 mm (9.5 in)	Non-NEBS: 240 mm (9.5 in) NEBS: 300 mm (11.8 in)	240 mm (9.5 in)	300 mm (11.8 in)	350 mm (13.78 in)
	Size (8.5" enclosure):							
	Height	43.7 mm (1.7 in)	43.7 mm (1.7 in)	43.7 mm (1.7 in)		43.7 mm (1.7 in)	43.7 mm (1.7 in)	-
	Width	220 mm (8.6 in)	215 mm (8.5 in)	215 mm (8.5 in)		215.9 mm (8.5 in)	215.9 mm (8.5 in)	-
	Depth	170 mm (6.7 in)	300 mm (11.8 in)	300 mm (11.8 in)	-	300 mm (11.8 in)	300 mm (11.8 in)	-
Environment	Temperature	Regular and NEBS: 0 to 50°C (32 to 122°F)	Regular: 0 to 50°C (32 to 122°F) Temperature hardened and NEBS: 20 to 65°C (-4 to 149°F)	Regular: 0 to 50°C (32 to 122°F) D-NFV: 0 to 45°C (32 to 113°F) Temperature hardened and NEBS: 40 to 65°C (-40 to 149°F)	Regular: 0 to 50°C (32 to 122°F) Temperature hardened and NEBS: 20 to 65°C (-4 to 149°F)	Regular: 0 to 50°C (32 to 122°F) Temperature hardened: 40 to 65°C (-40 to 149°F)	Regular: 0 to 50°C (32 to 122°F) Temperature hardened: 40 to 65°C (-40 to 149°F)	Regular: 0 to 50°C (32 to 122°F)
	Humidity	Up to 90%, non-condensing	Up to 90%, non-condensing	Up to 90%, non-condensing	Up to 90%, non-condensing	5% to 95%, non-condensing	5% to 95%, non-condensing	5% to 95%, non-condensing

Ordering

RECOMMENDED CONFIGURATIONS

ETX-203AX:

Configuration examples:

ETX-203AX/2SFP/4SFP
2 SFP fast Ethernet ports, 4 empty SFP slots

ETX-203AX/GE/2SFP/4SFP
2 SFP GbE Ethernet ports, 4 empty SFP slots

ETX-203AX/GE30/2SFP/4SFP
2 SFP GbE Ethernet ports, 4 empty SFP slots, multiple shapers per port

ETX-203AX/H/2SFP/4SFP
2 SFP FE ports, 4 empty SFP slots, temperature-hardened

ETX-203AX/2SFP/2UTP2SFP
2 SFP Ethernet ports, 2 UTP Ethernet ports, 2 SFP Ethernet ports

ETX-203AX/2SFP/4UTP
2 SFP Ethernet ports, 4 Ethernet UTP ports

ETX-203AX/2UTP/4UTP
2 UTP Ethernet ports, 4 Ethernet UTP ports

ETX-203AX/1SFP1UTP/4UTP
1 SFP Ethernet slot, 1 UTP Ethernet port, 4 Ethernet UTP ports

Note for ETX-203AX: *All ordering options are available with FE, GE, or GE30 options.*

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options for ETX-203AX.

SUPPLIED ACCESSORIES

AC power cord

CBL-RJ45/D9/F/6FT
Control port cable with male RJ-45 and female DB-9 connector

OPTIONAL ACCESSORIES

DC connection kit

RM-33-2
Hardware kit for mounting one or two ETX-203AX units in a 19" rack

RM-35/23-TYPE1-NEBS
Hardware kit for mounting one or two NEBS-compliant ETX-203AM or ETX-203AX units in a 19" rack

ETX-203AX-SW/GE30
Software license for 1 Gbps per port, and up to 64 shaped EVCs per port

ETX-203AX-SW/GE
Software license for 1 Gbps per port

RECOMMENDED CONFIGURATIONS

ETX-203AM:

Configuration examples:

ETX-203AM/DC/GE30/2ETH/2SFP2UTP
DC power supply, GbE Ethernet ports with multiple shapers, Ethernet network module, 2 SFP Ethernet ports, 2 copper Ethernet ports

ETX-203AM/AC/SH4W/4UTP
AC power supply, fast Ethernet ports, SHDSL 4-wire network module, 4 copper Ethernet ports

ETX-203AM/AC/GE/2ETH/4SFP
AC power supply, GbE Ethernet ports, Ethernet network module, 4 SFP Ethernet ports

ETX-203AM/AC/GE30/8E1T1/4UTP
AC power supply, GbE Ethernet ports, multiple shaped EVCs, E1/T1 8-port network module, 4 copper Ethernet ports

ETX-203AM/AC/GE/4UTP
AC power supply, GbE Ethernet ports, no network module, 4 copper Ethernet ports

ETX-203AM/H/AC/GE30/RTR/4SFP
AC power supply, GbE Ethernet ports, multiple shaped EVCs, router module, 4 SFP Ethernet ports, temperature-hardened

ETX-203AM/H/AC/2ETH/2SFP2UTP
DC power supply, GbE ports, Ethernet network module, 2 SFP Ethernet ports, 2 copper Ethernet ports, temperature-hardened

Notes for ETX-203AM:

- *All ordering options are available with FE, GE, or GE30 options.*
- *Only the Ethernet network module (2ETH) is NEBS certified.*
- *The router module (RTR) is provided only with a temperature-hardened enclosure.*

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options for ETX-203AM.

SUPPLIED ACCESSORIES

AC power cord (if AC power supply is ordered), or DC connector kit (if DC power supply is ordered)

CBL-RJ45/D9/F/6FT
Control port cable with male RJ-45 and female DB-9 connector

CBL-E1-SPLT
Cable to extract 2 E1/T1 ports from one RJ-45 connector of ETX-203AM E1/T1 network module (four cables are supplied if 8 E1T1 option is ordered)

OPTIONAL ACCESSORIES

CBL-RJ45/2BNC/E1/X
Balanced E1 (RJ-45) to unbalanced E1 (2 BNC) adapter cable

RM-35/@
Hardware kit for mounting one or two ETX-203AM units in a 19" rack

@ Rack mount kit (Default=Both kits):
- **P1** Kit for mounting one unit
- **P2** Kit for mounting two units

RM-35/23-TYPE1-NEBS
Hardware kit for mounting one or two NEBS-compliant ETX-203AM or ETX-203AX units in a 19" rack

WM-35
Wall mount hardware kit for one ETX-203AM unit

ETX-203AM-SW/GE30
Software license for 1 Gbps per port, and up to 64 shaped EVCs per port

ETX-203AM-SW/GE
Software license for 1 Gbps per port

ETX-M/2ETH
Ethernet uplink module for ETX-203AM with two combo ports

ETX-M/SH4W
EFM bonded uplink module for ETX-203AM with 2 SHDSL ports (4-wire)

ETX-M/SH8W
EFM bonded uplink module for ETX-203AM with 4 SHDSL ports (8-wire)

ETX-M/4E1T1
Ethernet uplink module for ETX-203AM with 4 E1/T1 ports

ETX-M/8E1T1
Ethernet uplink module for ETX-203AM with 8 E1/T1 ports

Note*: The CBL-E1-SPLT cables must be ordered separately when ordering this module.*

ETX-M/1T3
Ethernet uplink module for ETX-203AM with 1 T3 port

ETX-M/2T3
Ethernet uplink module for ETX-203AM with 2 T3 ports

ETX-M/RTR
Ethernet module with integrated 1 Gbps router (provided only with temperature-hardened enclosure)

RECOMMENDED CONFIGURATIONS

ETX-205A:

Configuration examples:

ETX-205A/AC/19
AC power supply, 19" enclosure

ETX-205A/AC/19/4E1T1
AC power supply, 19" enclosure, 4 E1/T1 ports

ETX-205A/AC/19/8E1T1
AC power supply, 19" enclosure, 8 E1/T1 ports

ETX-205A/AC/19/SYE
AC power supply, 19" enclosure, SyncE

ETX-205A/AC/19/PTP
AC power supply, 19" enclosure, 1588v2 timing and SyncE

ETX-205A/AC/19/4E1T1/PTP
AC power supply, 19" enclosure, 4 E1/T1 ports, 1588v2 timing and SyncE

ETX-205A/AC/19/8E1T1/PTP
AC power supply, 19" enclosure, 8 E1/T1 ports, 1588v2 timing and SyncE

ETX-205A/AC/19/GPS
AC power supply, 19" enclosure, integrated grandmaster and GNSS receiver

ETX-205A/AC/19/RTR
AC power supply, 19" enclosure, integrated 1 Gbps router

ETX-205A/AC/PTP
AC power supply, 8.5" enclosure, 1588v2 timing and SyncE

ETX-205A/DC/4E1T1/PTP
DC power supply, 8.5" enclosure, 4 E1/T1 ports, 1588v2 timing and SyncE

ETX-205A/HN/DCR/19/PTP
Dual DC power supply, temperature-hardened NEBS-certified 19" enclosure, 1588v2 timing and SyncE

Note for ETX-205A: *19" ordering options are available with any combination of AC or DC power supplies.*

ETX-205A (D-NFV):

ETX-205A/AC/19V/DC2X/128S/HST
AC power supply, dual core 2.5 GHz x86 processor, 128 GB solid state disk (SSD), high-scale PM controller application

ETX-205A/AC/19V/DC2X/128S
AC power supply, dual core 2.5 GHz x86 processor, 128 GB solid state disk (SSD)

ETX-205A/AC/19V/QC18/128S
AC power supply, 1.8 GHz x86 processor, 128 GB solid state disk (SSD)

Note for ETX-205A (D-NFV): *The D-NFV options are available with a single AC power supply, and do not support NEBS, dying gasp, TDM ports, or timing options.*

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options for ETX-205A.

SUPPLIED ACCESSORIES

Power cord (one per power supply)

CBL-RJ45/D9/F/6FT
Control port cable with male RJ-45 and female DB-9 connector

RM-34
Hardware kit for mounting one 19" ETX-205A unit in a 19" rack

OPTIONAL ACCESSORIES

CBL-RJ45/2BNC/E1/X
Balanced E1 (RJ-45) to unbalanced E1 (2 BNC) adapter cable

RM-34-23
Hardware kit for mounting one 19" ETX-205A unit in a 23" rack

RM-35/@
Hardware kit for mounting one or two 8.5" ETX-205A units in a 19" rack

@	Rack mount kit (Default=Both kits):	
	P1	Kit for mounting one unit
	P2	Kit for mounting two units

WM-34
Wall mount hardware kit for one 19" ETX-205A unit

WM-35
Wall mount hardware kit for one 8.5" ETX-205A unit

ETX-205A-PS/?/!

?	NEBS	
	NULL	International
	N	NEBS3
!	Power supply	
	AC	Single AC power supply
	DC	Single DC power supply

RECOMMENDED CONFIGURATIONS

ETX-220A:

Configuration examples:

ETX-220A/AC/2XFP/20S/SYE/ESK
AC power supply, 2 XFP 10GbE ports, 20 SFP GbE ports, SyncE, enhanced SW key

ETX-220A/AC/2XFP/10U10S/SYE/ESK
AC power supply, 2 XFP 10GbE ports, 10 copper GbE ports, 10 SFP GbE ports, SyncE, enhanced SW key

ETX-220A/AC/3XFP/10S/SYE/ESK
AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, enhanced SW key

ETX-220A/AC/3XFP/10U/SYE/ESK
AC power supply, 3 XFP 10GbE ports, 10 copper GbE ports, SyncE, enhanced SW key

ETX-220A/AC/3XFP/10S/PTP/ESK
AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, 1588v2, enhanced SW key

ETX-220A/H/DCR/2XFP/20S/SYE/ESK
Temperature hardened, dual DC power supplies, 2 XFP ports, 20 SFP GbE ports, SyncE, enhanced SW key

ETX-220A/AC/4XFP/10U/SYE/ESK
AC power supply, 4 XFP 10GbE ports, 10 copper GbE ports, SyncE, enhanced SW key

ETX-220A/AC/4XFP/SYE/ESK
AC power supply, 4 XFP 10GbE ports, SyncE, enhanced SW key

ETX-220A/AC/2XFP/20S/SYE/BSK
AC power supply, 2 XFP 10GbE ports, 20 SFP GbE ports, SyncE, basic SW key

ETX-220A/AC/2XFP/10U10S/SYE/BSK
AC power supply, 2 XFP 10GbE ports, 10 copper GbE ports, 10 SFP GbE ports, SyncE, basic SW key

ETX-220A/AC/3XFP/10S/SYE/BSK
AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, basic SW key

ETX-220A/AC/3XFP/10U/SYE/BSK
AC power supply, 3 XFP 10GbE ports, 10 copper GbE ports, SyncE, basic SW key

ETX-220A/AC/3XFP/10S/PTP/BSK
AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, 1588v2, basic SW key

ETX-220A/DC/4XFP/10S/SYE/BSK
DC power supply, 4 XFP 10GbE ports, 10 SFP GbE ports, SyncE, basic SW key

ETX-220A/DC/4XFP/10U/SYE/BSK
DC power supply, 4 XFP 10GbE ports, 10 copper GbE ports, SyncE, basic SW key

ETX-220A/DC/4XFP/SYE/BSK
DC power supply, 4 XFP 10GbE ports, SyncE, basic SW key

Notes for ETX-220A:

- *The Basic Software Key (BSK) option provides basic scheduling with a single queue block per port; the Enhanced Software Key (ESK) option allows for HQOS with shaping per EVC by providing more queue blocks per port (refer to user manual for the exact number).*
- *All ordering options are available with AC, DC, dual AC (ACR) or dual DC (DCR) power supplies.*

ETX-2

Carrier Ethernet Demarcation

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options for ETX-220A.

SUPPLIED ACCESSORIES

Power cord (one per power supply)

CBL-RJ45/D9/F/6FT
Control port cable with male RJ-45 and female DB-9 connector

RM-34
Hardware kit for mounting one ETX-220A unit in a 19" rack

OPTIONAL ACCESSORIES

RM-34-23
Hardware kit for mounting one ETX-220A unit in a 23" rack

WM-34
Wall mount HW kit for one ETX-220A unit

ETX-220A_PS/N/!

! Power supply:
- **AC** Single AC power supply
- **DC** Single DC power supply

RECOMMENDED CONFIGURATIONS

ETX-2i:

Configuration examples:

ETX-2i/AC/19
AC power supply, 19" enclosure, 8 fixed GbE SFP/copper combo ports

ETX-2i/AC/M
AC power supply, 8.5" enclosure, 4 fixed GbE SFP/copper combo ports, modular uplink

ETX-2i/DDC/M/PTP
Dual DC feed power supply, 8.5" enclosure, 4 fixed GbE SFP/copper combo ports, modular uplink, SyncE and 1588v2 timing

ETX-2i/H/AC/19/PTP
AC power supply, 19" enclosure, temperature-hardened, 8 fixed GbE SFP/copper combo ports, SyncE and 1588v2 timing

ETX-2i/H/ACR/19/PTP
Dual AC power supply, 19" enclosure, temperature-hardened, 8 fixed GbE SFP/copper combo ports, SyncE and 1588v2 timing

ETX-2i/HN/AC/19/PTP
AC power supply, 19" enclosure, NEBS compliant, temperature-hardened, 8 fixed GbE SFP/copper combo ports, SyncE and 1588v2 timing

ETX-2i/N/ACHP/19V
AC power supply, 19" enclosure, NEBS compliant, 4 fixed GbE SFP/copper combo ports, modular uplink, D-NFV module slot

Note: *Any D-NFV option must be ordered together with a RADcare Package and RADcare Project Assurance Package.*

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options, including the integrated router option

SUPPLIED ACCESSORIES

AC power cord

OPTIONAL ACCESSORIES

DC connection kit

RM-34
HW kit for mounting one 19" unit in a 19" rack

RM-35/@
Hardware kit for mounting one or two 8.5" units in a 19" rack

@ Rack mount kit (Default=Both kits):
- **P1** Kit for mounting one unit
- **P2** Kit for mounting two units

WM-35
Wall mount hardware kit for one 8.5" unit

ETX-2i-PS/?/!

? NEBS
- **NULL** International
- **N** NEBS3

! Power supply
- **AC** Single AC power supply
- **DCHP** High power DC power supply for D-NFV
- **ACHP** High power AC power supply for D-NFV

Network interface modules for modular and D-NFV ordering options:

ETX-M/2ETH
Ethernet uplink module with 2 combo ports

ETX-M/SH4W
EFM bonded uplink module with 2 SHDSL ports (4-wire)

ETX-M/SH8W
EFM bonded uplink module with 4 SHDSL ports (8-wire)

ETX-M/4E1T1
Ethernet uplink module with 4 E1/T1 ports

ETX-M/8E1T1
Ethernet uplink module with 8 E1/T1 ports

ETX-M/1T3
Ethernet uplink module with 1 T3 port

ETX-M/2T3
Ethernet uplink module with 2 T3 ports

D-NFV modules for D-NFV ordering options:

ETX-DNFV-M/i7/128S
D-NFV module based on Quad Core i7 and 128 GB SSD

ETX-DNFV-M/i7/128S/8R
D-NFV module based on Quad Core i7 and 128 GB SSD, 8 GB RAM

SOFTWARE LICENSES FOR ETX-2

ETX-2-SW TWAMP
License to activate and operate TWAMP related functionalities in ETX-2

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